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ABSTRACT

A study investigated how children's constitutional temperament (Easy, Difficult, or Intermediate), measured at 18 months of age, influences their adaptation to formal schooling. Information was collected from 35 children and their parents who were part of a longitudinal study of development. All participants were first-born children from Euro-American, upper-middle class, two-parent families in a midwestern suburb. Parental reports of toddler temperament were obtained using the Toddler Temperament Scale. Several measures were used as pre- and post-Kindergarten assessments. Mixed factorial analyses of variance revealed that children with Easy temperaments adapted well to kindergarten, showing gains in IQ and academic achievement, and maintaining their levels of adaptive behavior. Children with Difficult temperaments, on the other hand, adapted poorly, showing declines in IQ and adaptive behavior. Findings suggest that there is a relationship between early childhood temperament ratings and both cognitive and behavioral skills at school entry. (HTH)

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Can Toddler Temperament Characteristics Predict Later School Adaptation?

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Abstract

This study investigated how children's constitutional temperament (Easy, Difficult, or Intermediate) measured at 18-months influences their adaptation to formal schooling. Mixed factorial analyses of variance revealed that Easy children adapted well to kindergarten, showing gains in IQ and academic achievement and maintaining their levels of adaptive behavior. Difficult children, on the other hand, adapted poorly, showing declines in IQ and adaptive behavior. There was a relationship between temperament ratings during early childhood and both cognitive and behavioral skills at school entry.

Can Toddler Temperament Characteristics Predict Later School Adaptation?

Social scientists investigating stability and individual differences in temperamental qualities (or a person's characteristic behavioral patterns when responding to the environment) have found that these qualities represent traits that may persist through infancy, into childhood, and beyond. Indeed, there is evidence that temperamental patterns demonstrate stability from birth until early adolescence (Robeson, 1997; Plomin, Emde, Braungart, & Campos, 1993; Stifter & Fox, 1990), thereby supporting the notion that temperament is an enduring characteristic trait of a child. Researchers have suggested that such early temperamental components are the precursors of later personality traits (Sanson & Rothbart, 1995; Bates & Wachs, 1994; Martin, 1993).

Given this stability, considerable attention is now being directed toward determining how temperamental style predicts important developmental outcomes (see Rothbart & Bates, 1998 for a review). First, Campos, Barrett, Lamb, Goldsmith, and Sternberg (1983) reviewed literature in this area and reported that individual differences in infant temperamental characteristics--like persistence--predict cognitive skills and IQ as well as growth over time. In addition, aspects of temperament have been related to socioemotional behaviors--like externalizing and aggression--and adaptive social skills (Bullock, 1993; Martin, 1993; McClowry, Giangrande, Tommasini, Clinton, Foreman, Lynch. & Ferketick, 1994). For example, McClowry and colleagues (1994) found that low persistence and negative reactivity explained 56% of the variance in externalizing behaviors. Since both socioemotional/adaptive functioning and cognitive skills are important predictors of school achievement (Griffin, 1997; Morrison, Griffith, & Williamson, 1993; Robeson, 1995; Wentzel, 1993), one might predict that temperament characteristics would be a strong predictor of school adjustment. The purpose of this study was to examine how indices of toddler temperament predict children's comprehensive school adjustment over the kindergarten year. It was anticipated that temperament

Aim of the Study:

- Examine how indices of temperament obtained in early childhood predict children's cognitive and behavioral skills at the beginning and end of the kindergarten period. In other words, we assessed the interaction between temperament category (Easy, Difficult, Intermediate) and time of the school year to investigate how children's temperament was related to elementary school adjustment.

Method

Subjects

Information was collected from 55 children and their parents who were recruited as part of a longitudinal study of development; 35 children remained at the beginning of kindergarten. Comparisons of background demographic variables (child's chronological age, child's IQ, maternal education, and paternal education) revealed no statistically significant differences between the children who dropped out and those who remained for the duration of the study. All participants were first-born children from Euro-American, upper-middle class, two-parent families living in a midwestern suburb. The sample was evenly divided between males and females (56.4% and 43.6% respectively). On average, both parents had received college degrees (father's mean years of education was 17.26 and mothers' mean years of education was 16.28). The average maternal age at the time of the child's birth was 28.77 years. The sample was selected to have relatively homogeneous middle class socio-economic backgrounds so that the stability of different temperamental characteristics could be examined in the absence of marked deviations due to environmental influences.

Materials and Procedure

Temperament. Parental reports of toddler temperament were obtained at eighteen months from the Toddler Temperament Scale (Fullard, McDevitt, Carey, 1984) derived from the work of Thomas and

Chess in the New York Longitudinal Study. Assessments for this investigation were made in nine areas of temperament as described by Thomas and Chess (1963):

- Threshold of Stimulation--the level of stimulation necessary to evoke a response;
- Rhythmicity/predictability--the degree of or regularity in a child's behavior;
- Activity Level--the energy level of the child;
- Distractibility--the child's ability to disregard environmental stimulation;
- Mood--the quality of the child's emotional state;
- Response intensity--the intensity level of a child's reaction;
- Adaptability--the length of time to respond to a new situation;
- Persistence--attention span;
- Approach/withdrawal--whether the child's initial response to new stimulus is to approach or withdraw.

Using the Thomas and Chess classification criteria 13 infants were categorized as Easy, 7 as Difficult, 14 as Intermediate (both high and low) temperament.

Cognitive and Behavioral Skills at the Beginning of Kindergarten. The pre- and post- kindergarten assessments included the following measures of cognitive and behavioral skills:

- Wechsler Preschool Primary Intelligence Scale (WPPSI), including the full scale IQ, performance IQ, and verbal IQ scores;
- Peabody Individual Achievement Test (PIAT), providing a general measure of academic performance across four content areas;
- Vineland Adaptive Behavior Scales, providing measures of adaptive/social maturity and the frequency of maladaptive behaviors.

Results

Statistical Analysis Plan

Table 1 presents the findings obtained for each of the measures taken during the pre- and post-kindergarten assessments and analyzed by mixed design analyses of variance with Temperament Category as a between-subjects variable (3 levels: Easy, Difficult, Intermediate) and Time of Testing as a within-subjects variable (2 levels: pre- and post- kindergarten). For outcome measures with a significant group by time interaction, follow-up stepwise regression analyses were computed with the nine temperament dimensions as independent variables to examine which aspects of temperament were most related.

Pre- and Post- Kindergarten Effects

Results revealed a significant main effect of time of testing on the PIAT and the Vineland Adaptive Behavior scores. As one might expect, children's PIAT scores increased over the kindergarten year. On the other hand, adaptive behavior scores on the Vineland declined over the course of the kindergarten. In addition, there were non-significant trends toward increasing full scale and verbal IQs over the course of the kindergarten year.

School Adaptation

Although temperament category did not account for a significant amount of the variance in any of the outcome measures, it did interact with time of testing on five out of the seven outcome measures. First, there was a significant time of testing by temperament group interaction on both IQ sub-scales and on total score (see Figures 1-3). Children classified as Easy or Intermediate in temperament at 18-months showed increases over the kindergarten year, while children classified as Difficult actually declined ($F(1,30)=3.66$, $p<.05$ for full-scale IQ; $F(1,30)=3.85$, $p<.05$ for performance IQ; $F(1,30)=3.43$, $p<.05$ for verbal IQ).

In order to probe what particular aspects of temperament seem to be associated with the observed interaction of temperament category and time of testing on outcome measures, stepwise regression analyses were performed with the nine separate temperamental dimensions as predictors. These analyses indicated that more positive moods (r^2_{Δ}=.14, F_{Δ}=4.73, $p<.05$) and lower persistence (r^2_{Δ}=.15, F_{Δ}=6.08, $p<.05$) were associated with gains in full-scale IQ over the kindergarten year. Similarly, more positive moods and less persistence together predicted 49% of the variance in verbal IQ scores (r^2_{Δ}=.34, F_{Δ}=15.63, $p<.001$ and r^2_{Δ}=.12, F_{Δ}=6.48, $p<.02$ respectively). A different picture emerged for performance IQ scores with no particular dimension emerging as a significant predictor of the kindergarten adjustment by temperament category interaction.

Although only statistical trends, there were also suggestions in the data that changes in both academic achievement ($F(1,30)=1.81$, $p<.10$) and in adaptive behaviors ($F(1,30)=1.05$, $p<.10$) also varied across temperament groups (see Figures 4 and 5). In the case of academic achievement, these data suggested that the largest gains were made for the Easy children, with somewhat smaller gains being made for the Difficult and Intermediate children. Similarly, Easy children showed only a very small decline in adaptive behavior scores over the kindergarten years whereas the Difficult children showed the largest losses with the Intermediate children falling in the middle.

Conclusions

These results suggest that temperamental qualities assessed at 18-months have important implications for kindergarten adjustment. In particular, Easy children adapt well, showing increases in overall intelligence, larger increases in academic achievement than the children belonging to other temperamental categories, and only very slight declines in adaptive behavior. Difficult children, on the other hand, show declines in intelligence, somewhat smaller gains in academic achievement and losses in adaptive behavioral functioning. Finally, toddlers rated with Intermediate temperaments predictably

performed between Easy and Difficult children, but also appeared to adapt well showing an increase in adaptive behaviors and intellectual achievement points over the course of the kindergarten year. These results provide information for intervention efforts aimed at easing the transition into formal schooling. It would be worthwhile for parents and/or educators to focus on temperamental predisposition and be sensitive to individual differences when tailoring program activities or curricula.

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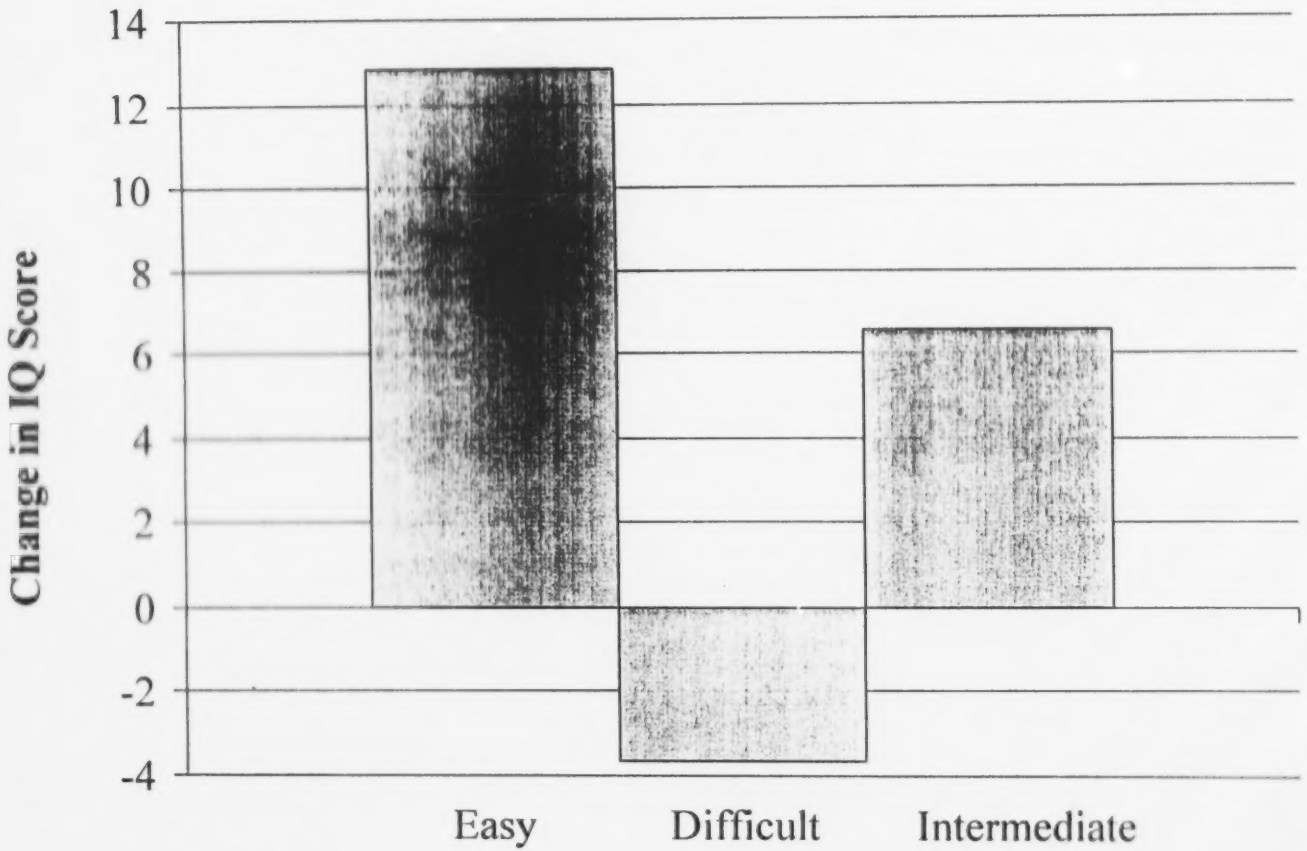
Table 1. Mean Scores and Analysis of Variance Results Easy, Difficult, and Intermediate Temperament Categories at Pre- and Post- Kindergarten (With Standard Deviations in Parentheses)

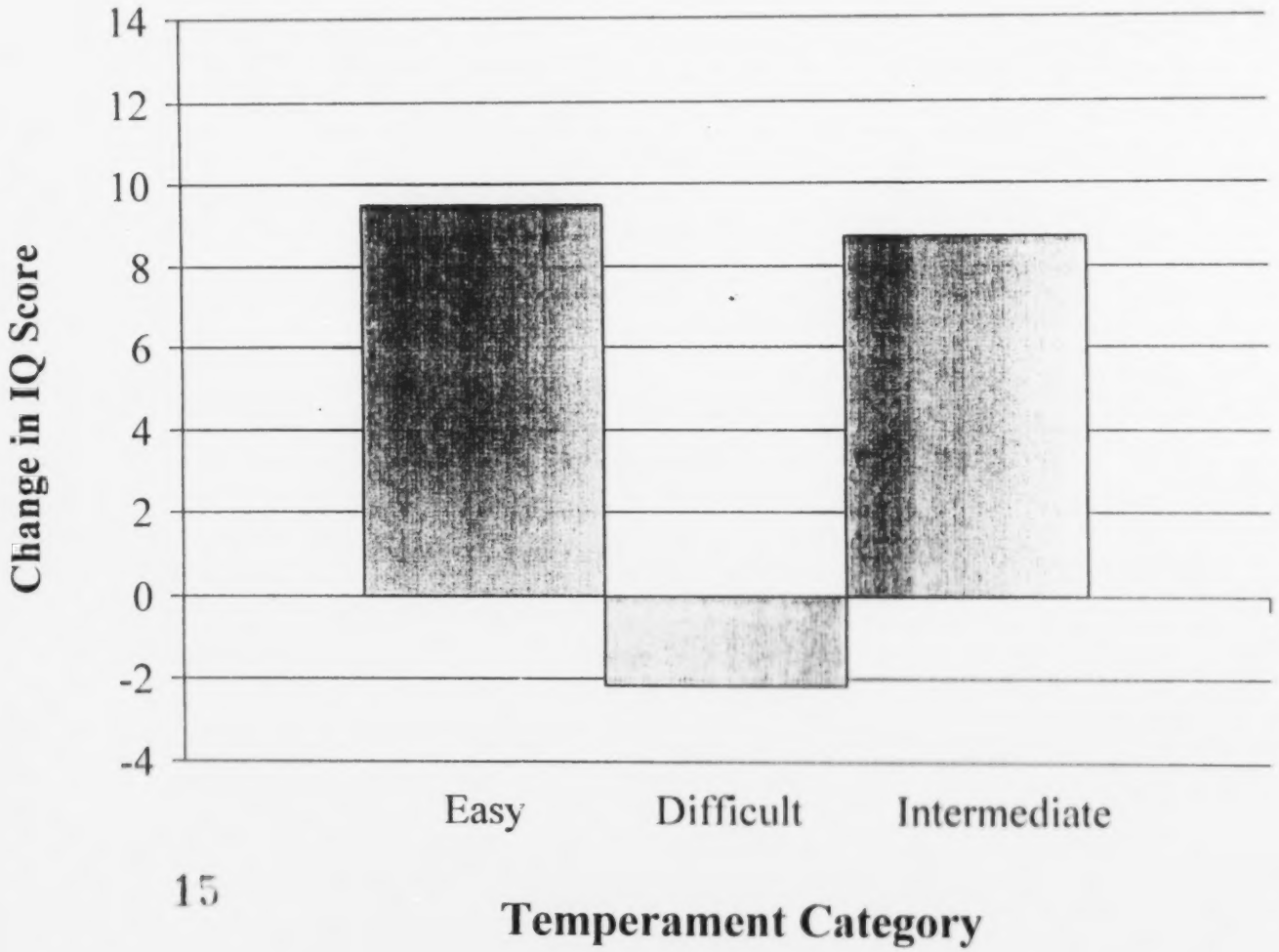
Measures		Easy	Difficult	Intermediate	ANOVA $F(1, 30)$ Time	Group	T X G
Wechsler Preschool Primary Test of Intelligence							
Full Scale IQ:					3.80 τ	.23	3.66 *
	Pre-K	106.67 (4.62)	118.00 (8.27)	112.79 (8.97)			
	Post-K	119.50 (4.95)	114.33 (7.94)	119.36 (9.03)			
Performance IQ:					2.63	.20	3.85 *
	Pre-K	109.00 (3.61)	116.14 (15.26)	110.43 (11.04)			
	Post-K	118.50 (4.95)	114.00 (10.56)	119.14 (8.34)			
Verbal IQ:					2.93 τ	.11	3.43 *
	Pre-K	103.00 (8.19)	115.86 (7.80)	112.50 (11.90)			
	Post-K	117.00 (4.24)	112.33 (5.50)	116.07 (10.59)			
Peabody Individual Achievement Test					113.37 ***	.78	1.81 τ
	Pre-K	8.25 (3.25)	8.00 (2.83)	9.79 (2.67)			
	Post-K	15.08 (3.09)	13.33 (1.97)	14.36 (3.03)			
Vineland Adaptive Behavior Scales							
Adaptive Behaviors:					7.30 **	.26	1.05 τ
	Pre-K	109.92 (9.02)	111.71 (13.61)	113.71 (7.70)			
	Post-K	108.46 (11.71)	104.33 (9.91)	108.07 (6.84)			
Maladaptive Behaviors:					.01	.50	.53
	Pre-K	5.55 (4.87)	4.67 (1.53)	5.85 (4.14)			
	Post-K	7.33 (3.20)	4.50 (2.52)	6.93 (5.84)			

τ $p<.10$
* $p<.05$
** $p<.01$
*** $p<.001$

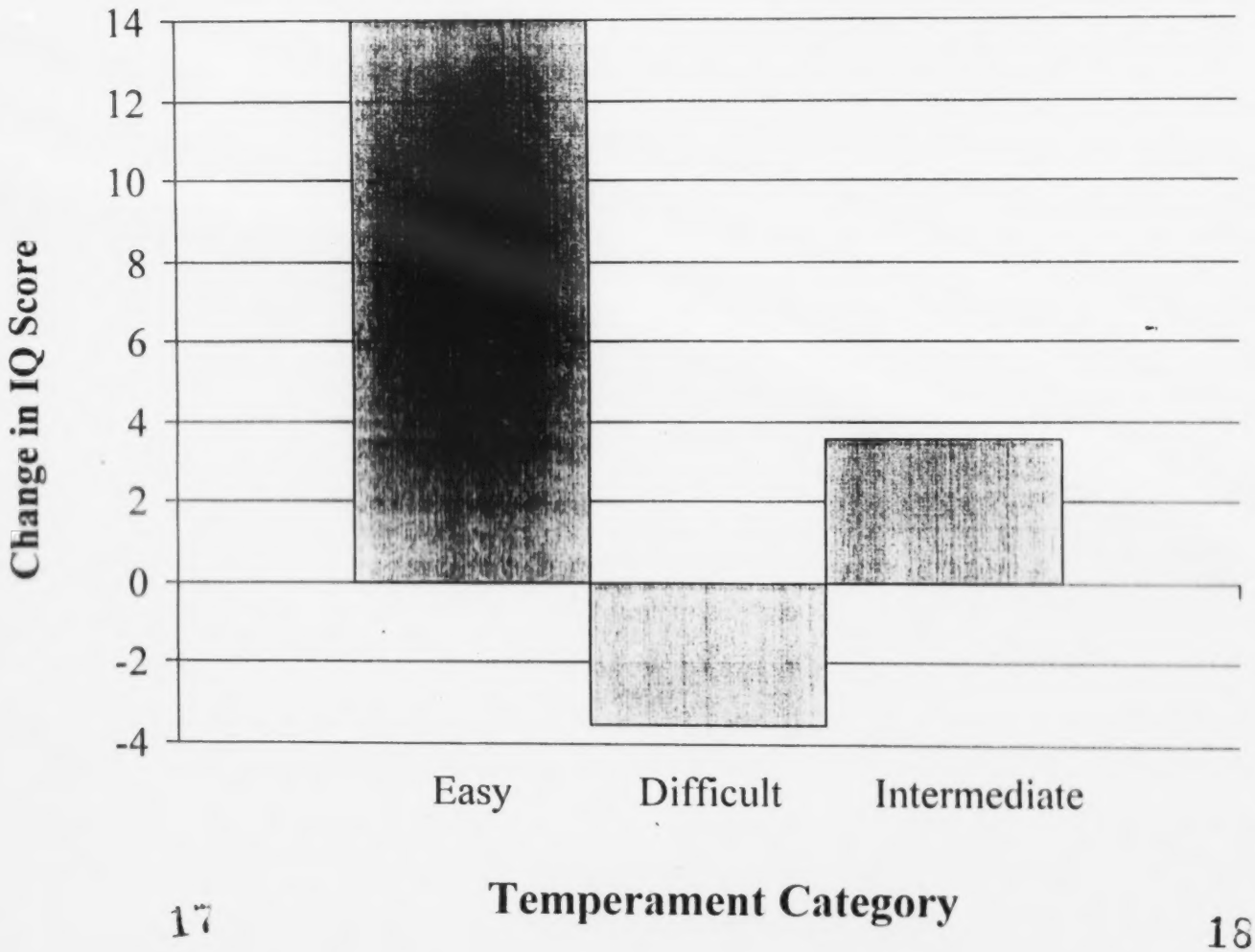
Pre- to Post- Kindergarten Change in Full-Scale IQ Score by Temperament Group



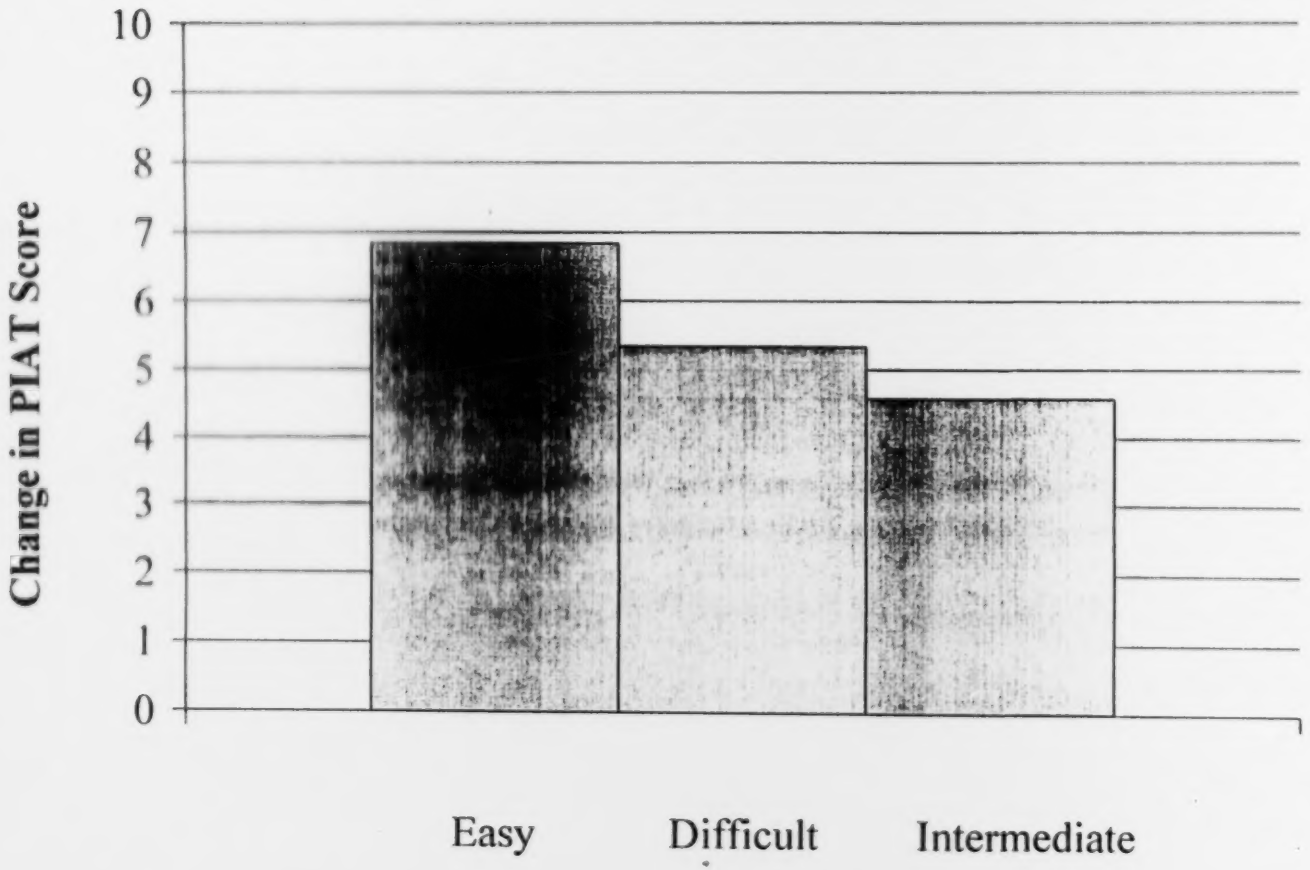
Pre- to Post- Kindergarten Change in Performance IQ Score by Temperament Group



Pre- to Post- Kindergarten Change in Verbal IQ Score by Temperament Group



Pre- to Post- Kindergarten Change in Academic Achievement Score by Temperament Group



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Pre- to Post- Kindergarten Change in Adaptive Behavior Score by Temperament Group